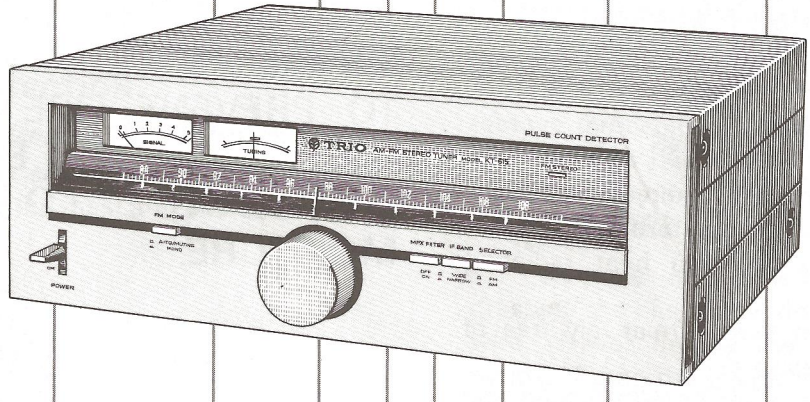
AM-FM STEREO TUNER

# KT-615

INSTRUCTION MANUAL




TRIO

## INTRODUCTION

The purpose of this manual is to acquaint you with the operating features of your new tuner. You will notice that in every detail of planning, engineering, styling, operating convenience, and adaptability, we have sought to anticipate your needs and desires.

We suggest that you read this manual carefully. Knowing how to set up your tuner, to the best advantage will enhance your listening pleasure right from the start. You will also become aware of the ease with which you can adjust your tuner to meet your special requirements.

## FOR YOUR RECORDS

Record the serial number, found on the back of the unit, in the spaces designated on the warranty card, and in the space provided below. Refer to the model and serial numbers whenever you call upon your Trio dealer for information or service on this product.

Model KT-615 Serial number_____

## UNPACKING

Unpack the unit carefully and make sure that all accessories and cables are put aside so they will not be lost.

Examine the unit for any possibility of shipping damage. If your unit is damaged or fails to operate, notify your dealer immediately. If your unit was shipped to you directly, notify the shipping company without delay. Only the consignee (the person or company receiving the unit) can file a claim against the carrier for shipping damage.

We recommend that you retain the original carton and packing materials for use should you transport or ship the unit in the future.

## INSTALLATION PRECAUTIONS

(a) Avoid locations subject to direct sunlight.
(b) Avoid high or low temperature extremes.
(c) Keep the unit away from heat radiating sources.
(d) Choose a location that is relatively free of vibration or excessive dust.
(e) Make sure power is off before making any system connections.

## WARNING

THIS APPARATUS MUST BE EARTHED.

## IMPORTANT

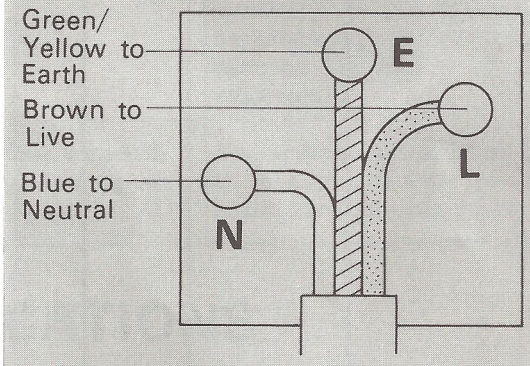
The wires in this mains lead are coloured in accordance with the following code:

Green and Yellow ..... Earth
Blue ..... Neutral
Brown ..... Live

The wires in this mains lead must be connected to the terminals in the plug as follows:

| Wire Colour | Plug Terminal Marking |
|---|---|
| Green and Yellow ..... | E or ⏚ or Green or Green and Yellow |
| Blue ..... | N or Black |
| Brown ..... | L or Red |

The mains plug must be removed from the wall socket prior to any internal examination.




**FUSE RATINGS**

If a 13-amp plug is used, this must be fitted with a 5-amp fuse.

## WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

# FEATURES

1. **High Performance Front End**
   Specially selected dual-gate MOS FET is the active amplifier in single and double tuned stages that are controlled by a precision-machined four gang tuning capacitor. The design yields a state of the art sensitivity figure of 10.3 dBf (IHF rating), but retains the ability to stand up to signals approaching 1 volt in amplitude without sacrificing cross modulation, spurious response or intermodulation performance.
2. **Pulse-Count FM Demodulation**
   A major advance in FM technology, the pulse-count demodulator first converts each FM cycle into a pulse of carefully controlled amplitude and time duration. Computer-type processors then make an accurate count of these pulses to produce an audio-signal that varies precisely with pulse density. The results are a theoretical and practical freedom from distortion and a major improvement in overall signal-to-noise ratio.
3. **Choice of Wide or Narrow IF Bandwidth**
   Providing the equivalent of two special purpose tuners the switchable IF system permits selection of wide bandwidth for maximum fidelity of clear channels. Narrow operation, enables you to rescue relatively weak stations from overpowering stations at nearby points on the dial.
4. **Error-Amplifier Power Regulators**
   Feedback type voltage regulators provide constant operating voltages, free of ripple and noise for performance unmarred by hum or extraneous sound.
5. **Extra-Long Linear Scale**
   The precision linear-frequency tuning capacitor coupled with a 270 mm effective dial length, provides large, uniforms calibration marks for easy and accurate tuning. Mechanical drive using differential pulleys and a massive 60 mm flywheel give the tuning knob smooth, effortless, but positive action.
6. **Stability Engineered for the Long Term**
   Computer-type pulse count detection, coupled with ceramic IF filters and three dimensional control over component locations in key circuits ensure years of operation without drift or the need for realignment.

# SAFETY PRECAUTIONS

### CLEANING

Do not use volatile liquids such as alcohol, paint thinner, gasoline, benzine, etc. when cleaning the cabinet. Use a silicon cloth or a soft dry cloth.

### LIGHTNING PROTECTION

If an outside FM or AM antenna is used, be sure to consult your service representative about proper grounding of the mast and protection of the lead in.

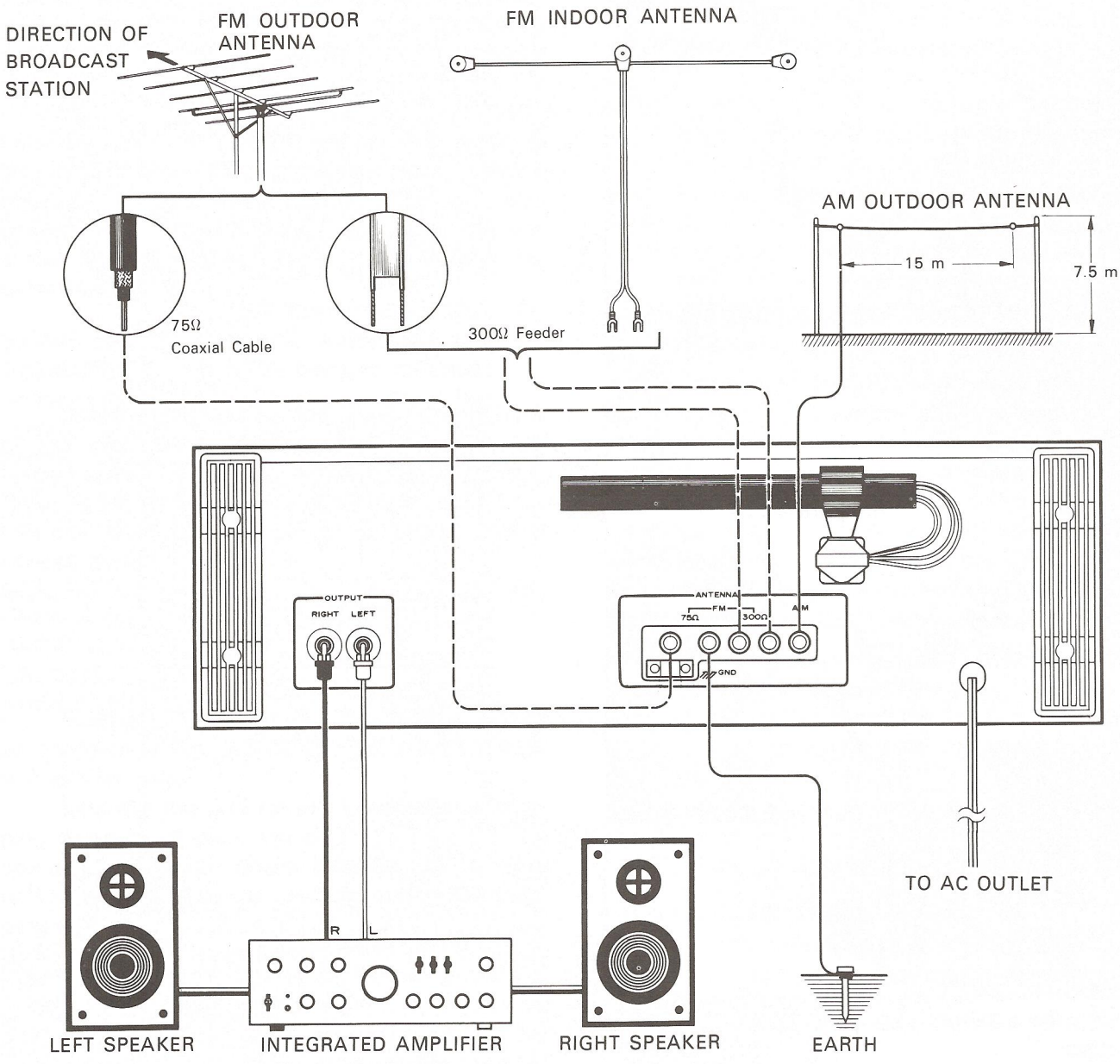
### MODIFICATIONS AND SERVICE

Each unit is shipped after it has been carefully adjusted and tested to provide optimum performance. The unit must not be modified internally. Unauthorized modifications will void the terms of the warranty. High voltages are used in some of the internal circuits. Therefore, do not remove the cabinet or touch internal parts. Refer all service to qualified service personnel.

### POWER CORD

Remove and insert the power plug by grasping the plug body; do not pull strongly on the wire. Never handle the power plug with wet hands. Route the power cord where it will not be subject to damage due to traffic, sharp edges, or moveable furniture.

# SYSTEM CONNECTION DIAGRAM




## OUTPUT JACKS

Connect these jacks to your amplifier's "TUNER" or "AUX" jacks using the supplied connecting cables.

## GROUND

For maximum safety and minimum interference connect the GND terminal to a good earth ground if practicable. A good earth ground is a cold water pipe or a metal stake driven into moist earth.

# SYSTEM CONNECTIONS

## FM ANTENNA CONNECTIONS

Your tuner approaches the theoretical limit in FM sensitivity. However, the performance of your system is determined to a very large extent upon the signal conditions where the antenna is placed. The reason is that FM broadcast signals travel in straight paths. Therefore they can be blocked by natural or man-made obstructions such as mountains, hills, or buildings. At large distances from the transmitter the curvature of the earth acts as a screen between transmitter and receiver.

Consider the signal conditions in planning your installation. If you live in or near an urban area the indoor antenna (supplied) may serve your needs adequately. However, if favorite stations are weak due to natural obstructions, or if you live in a building which is made of steel-reinforced concrete (which acts as a shield) it may be necessary to install a good outdoor antenna.

## FM INDOOR ANTENNA

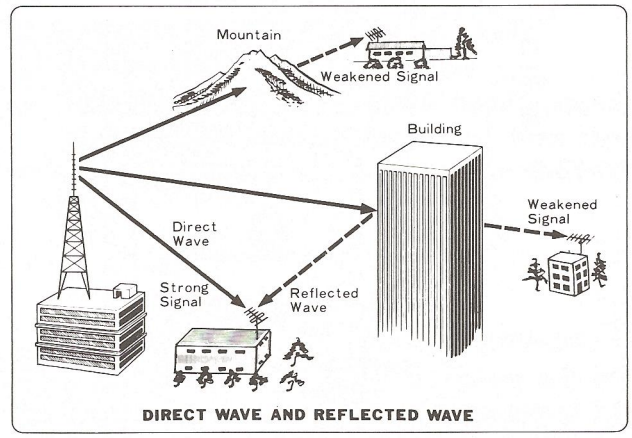
Connect the T-shaped indoor antenna (supplied) to the 300Ω FM ANTENNA terminals as shown in the SYSTEM CONNECTION DIAGRAM. Spread the two arms that form the top of the "T" horizontally and hold them against convenient wall surfaces. Try several locations for best results on your favorite stations. Tape the antenna in place where the best compromise is found between listening results and appearance.

## FM OUTDOOR ANTENNAS

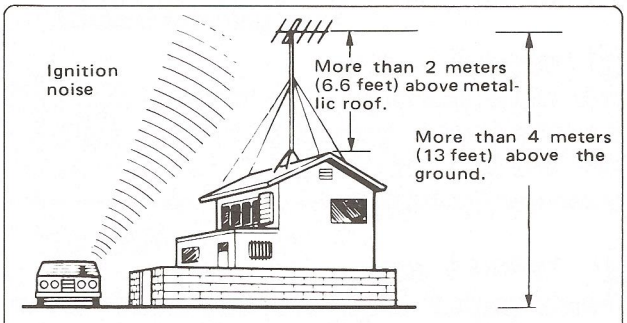
Consult with your dealer or service man about the best method of selecting and erecting an outdoor FM antenna. The choice of lead-in (feeder) wire is also important. The flat ribbon-shaped twin lead performs well electrically, is cheaper and is somewhat easier to handle in routing through windows and around rooms. Coaxial cable is more expensive, does a much better job of minimizing interference, is less prone to the effects of weather and close-by metal objects, and is nearly as good a signal conductor as the ribbon type wire. The latter is particularly true of foam-type coaxial cables. Coaxial cable is somewhat more difficult to install at the point where the cable enters the building. If coaxial cable is selected, make sure the antenna is designed to drive that type of cable. In many cases a matching transformer (balun) must be used to connect the antenna terminals to the coaxial cable.

**Note:**

Do not make connections to 300Ω and 75Ω antenna terminals simultaneously.




**DIRECT WAVE AND REFLECTED WAVE**




- To minimize auto-ignition noise, locate the antenna as far from heavy traffic as possible.
- Keep the feeder or coaxial cable as short as possible. Do not bundle or roll up excess cable.
- The antenna should be at least two meters (6.6 feet) from reinforced concrete walls, or metal structures.

**FM Outdoor Antenna Installation**

## AM ANTENNA CONNECTIONS

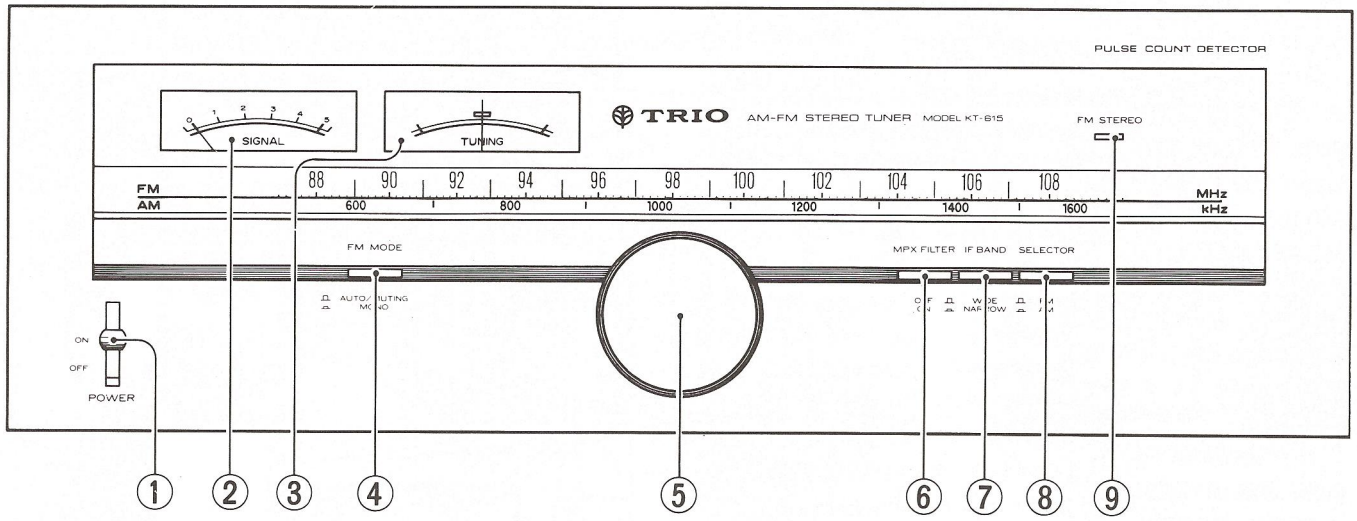
### AM Bar Antenna

Tune in your favorite AM station and position the ferrite-bar antenna for best reception. Try other stations and find the position that gives best overall reception.

### AM Outdoor Antenna

In steel buildings or at a great distance from the transmitter, it may be necessary to install an outside long-wire antenna. The end of this wire should be stripped of insulation and connected to the AM terminal as shown on page 4.

# CONTROLS AND INDICATORS




### ① POWER switch

Set this switch to "ON" to turn on the tuner. The dial indicator lights while the tuner is turned on. Set this switch to "OFF" to turn off the tuner.

### ② SIGNAL meter

This meter indicates the strength of AM or FM signals received. It is used as a tuning aid for both AM and FM tuning and very useful in making antenna adjustments.

### ③ TUNING meter

This meter gives a precise indication of correct FM tuning. Maximum stereo separation and minimum distortion are obtained when the tuner is tuned to center the pointer on the meter scale.

### ④ FM MODE switch

**AUTO/MUTING** — The tuner switches automatically between stereo and monaural operation in accordance with the manner in which the selected station is operating. In addition, noise is silenced as you tune between channels.

**MONO** — Turns off muting and provides monaural operation regardless of the manner of transmission. Use this setting (press in) for best reception of signals that are too weak to overcome the muting threshold or provide noise-free stereo.

### ⑤ TUNING knob

AM and FM stations are selected by turning this knob.

### ⑥ MPX FILTER switch

Minimizes noise in stereo reception sometimes encountered with weak FM signals. Press in to minimize such noise. This switch has no effect during mono reception.

### ⑦ IF BAND selector

**WIDE** — For normal use and minimum distortion.

**NARROW** — If a very strong adjacent channel interferes with a desired weak channel.

### ⑧ SELECTOR switch

**FM** — For reception of FM broadcasts.

**AM** — For reception of AM broadcasts.

### ⑨ STEREO indicator

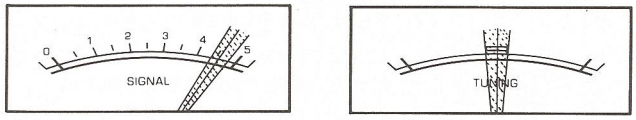
With the FM MODE switch set to AUTO/MUTING the lamp lights to indicate that the selected station is broadcasting in stereo. It remains out for monaural broadcasts and when the FM MODE switch is set to MONO.

# OPERATING INSTRUCTIONS

Prior to operating the tuner, make sure that your amplifier is prepared to receive FM or AM broadcasts. It is also advisable to carry out the operating instructions, referring to "CONTROLS AND INDICATORS" on page 6.

## FM RECEPTION

1. Set the source selector on your amplifier to "TUNER".
2. Set the SELECTOR switch to "FM".
3. Set the FM MODE switch to "AUTO/ MUTING".
4. Set the POWER switch to "ON".
5. Turn the tuning knob to place the dial pointer at the desired channel frequency. Fine tune first for a maximum reading on the SIGNAL meter then tune carefully to center the pointer on the TUNING meter.

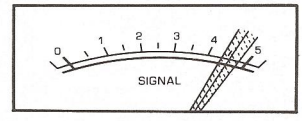



FM Reception

6. Adjust your amplifier VOLUME for the desired listening level.

## AM RECEPTION

1. Set the source selector on your amplifier to "TUNER".
2. Set the SELECTOR switch to "AM".
3. Set the POWER switch to "ON".
4. Turn the tuning knob to place the dial pointer at the desired channel frequency. Fine tune for a maximum reading on the SIGNAL meter.




AM Reception

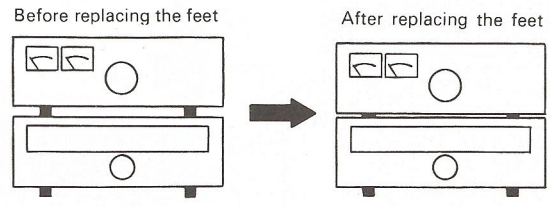
5. Adjust your amplifier VOLUME for the desired listening level.

## ABNORMAL CONDITIONS

1. If a station does not appear at the correct tuning spot on the dial, press FM MODE switch to "MONO". If the station is then heard it is exceptionally weak and FM MODE switch must remain at "MONO" for that channel unless some effort is made in the antenna system to raise signal level.
2. If the desired channel is interfered with from a very strong nearby channel, press the IF BAND selector in for NARROW operation.
3. In cases where the desired signal is exceptionally weak, a high frequency noise (hiss) may accompany stereo broadcasts. In that case better results may be obtained by depressing the MPX FILTER switch. If noise persists the signal strength is probably below the threshold needed for good stereo performance. In that case a better overall result may be had by switching the FM MODE switch to "MONO".

## ACCESSORY FEET

When you place the integrated amplifier on the tuner the clearance between them can be reduced to half by replacing feet provided at the bottom of the integrated amplifier with the shorter feet (8 mm) supplied with the tuner as accessory. This also makes them look more attractive.
If you place the tuner on the upper side, mount the above-mentioned shorter feet on the tuner.



# IN CASE OF DIFFICULTY

If your tuner should not perform as expected, consult the table below to see if the problem can be corrected before seeking help from your Trio dealer or service representative.

| Occurs During AM Reception Only | Possible Cause | Correction |
|---|---|---|
| Continuous low-frequency buzz. Most noticeable on weak stations or at night. | • Interference from fluorescent lamps, lamp dimmers, other appliances. | Turn off fluorescent lamps or lamp dimmer (Interference may come from neighbor's lamps). Try AM outdoor antenna and good ground at GND connections. This problem may be impossible to remove altogether. |
| High-frequency whistle especially at night. | • Interference from TV set.<br>• Beat from adjacent AM station. | • Turn off TV set, if problem disappears try relocating TV set.<br>• Impossible to eliminate, but try HIGH filter of your amplifier. |
| Intermittent buzz or crackling sound. | • Lightning.<br>• Fluorescent lamps starting.<br>• Appliance or furnace starting. | • No remedy.<br>• Try reversing AC plug.<br>• Try reversing AC plug. |
| **Occurs During FM Reception Only** | **Possible Cause** | **Correction** |
| Hiss that gets worse in stereo reception. | • Very weak antenna input signal. | Consider an outdoor antenna installation. In areas remote from the transmitter a 5 to 8 element antenna designed exclusively for FM is suggested. |
| Rhythmic static or popping noises. | • Automobile ignition noise, especially evident when receiving weak signals. | Review antenna installation. Site the antenna as far from the street as possible and use coaxial cable. |

# SPECIFICATIONS

## FM TUNER SECTION

**Sensitivity (DIN)**
**Mono:** S/N 26 dB, 40 kHz Dev ..... 0.9 μV
**Stereo:** S/N 46 dB, 46 kHz Dev ..... 25 μV
**50 dB Quieting Sensitivity Mono (IHF)** ..... 3.4 μV
**Limitting Level**
−3 dB Point, 40 kHz Dev ..... 0.5 μV
**Frequency Response** ..... 30 Hz～15 kHz
+0.2 dB, −1.5 dB
**Total Harmonic Distortion (DIN)**
**Mono:** 1 kHz, 40 kHz Dev ..... 0.15% (Narrow)
**Stereo:** 1 kHz, 46 kHz Dev ..... 0.35% (Narrow)
**S/N Weighted (DIN)**
**Mono:** 40 kHz Dev, 1 mV Input ..... 75 dB
**Stereo:** 46 kHz Dev, 1 mV Input ..... 67 dB
**S/N Unweighted (IHF)**
**Mono:** 75 kHz Dev, 1 mV Input ..... 81 dB
**Stereo:** 75 kHz Dev, 1 mV Input ..... 78 dB
**Image Rejection Ratio** ..... 85 dB
**Selectivity**
300 kHz, 20 dB Input ..... 74 dB (Narrow)
**IF Rejection Ratio** ..... 100 dB
**AM Suppression Ratio** ..... 65 dB
**Spurious Response Ratio** ..... 105 dB
**FM Stereo Separation (DIN): 1 mV Input**
250 Hz ..... 43 dB (Narrow)
1 kHz ..... 47 dB (Narrow)
6.3 kHz ..... 32 dB (Narrow)
12.5 kHz ..... 32 dB (Narrow)
**Capture Ratio** ..... 1.0 dB

## AM TUNER SECTION

**Sensitivity S/N 20 dB** ..... 13 μV
**Signal to Noise Ratio: 1 mV Input** ..... 50 dB
**Image Rejection Ratio** ..... 60 dB

## GENERAL

**Power Consumption** ..... 12W
**Dimensions** ..... W 440 mm
H 153 mm
D 402 mm
**Weight (Net)** ..... 7.2 kg

**Note:**
Trio follows a policy of continuous advancements in development. For this reason, specifications may be changed without notice.

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